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University of Bahrain

College of Information Technology
Department of Computer Science

ITCS332: Organization of Programming Languages

Quiz#5: Chapter 6_Types

- 1) Give two differences between the associative and regular arrays.
 - a) Regular arrays consist of **ordered** elements while associative arrays consist of **unordered** elements.
 - b) Regular arrays are of **fixed size**, while associative arrays are of **variable size**.
- 2) Given a matrix **U: array [25 .. 75][32 .. 80] of FLOAT**; starting address of array is 6600; element size is 3 bytes. Assuming column major ordering, calculate the address of matrix element U[50][55].

$$6600 + [(55-32) * (75-25+1) + (50-25)] * 3$$

- 3) Write an example of C++ code that illustrates (creates) lost heap dynamic variable.

```
void      *p1;

p1 = new int(10);

p1 = new float(7.4);  // heap location that contains 10 is lost.
```

Fill in blanks questions.

- 4) In C++, allocating 4 bytes for variables of type integer is decided by **Language Implementer** and enclosing array index in square brackets [] is decided by **Language Designer**.
- 5) The two mechanisms used to detect and solve dangling pointers are:
Tombstones and **Locks and Keys**.
- 6) The two primary approaches to implicitly deallocate heap storage are:
reference counters and **garbage collection**.
- 7) Dynamic-length strings are implemented using
adjacent memory cells or **linked list**

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- 8) Given a matrix **ME: array [15 .. 50][10 .. 60] of FLOAT**; starting address of array is 2400; element size is 8 bytes. Assuming row major ordering, calculate the address of matrix element ME[25][40].

$$2400 + [(25-15) * (60-10+1) + (40-10)] * 8$$

- 9) Write an example of C++ code that illustrates (creates) a dangling pointer.

```
double    *p1,*p2;
p1 = new double(55.75);
p2 = p1;
delete p1;    // p2 is a dangling pointer
```

- 10) Give two differences between the arrays and the records.
- a) Arrays consist of **homogeneous** elements while records consist of **heterogeneous** elements.
 - b) Array elements are accessed using **indices**, while record elements are accessed using **names**.

Fill in blanks questions.

- 11) In large computers, pointers are represented as **single values**; and in Intel microprocessors, pointers are represented using **a pair of values: segment and offset**.
- 12) In C++, enclosing array index in square brackets [] is decided by **Language Designer**. And allocating 8 bytes for variables of type double is decided by **Language Implementer**.
- 13) In C++, the fields of structures are referenced using **dot** operator; in FORTRAN95, the fields of records are referenced using **%** operator.
- 14) For every assignment to a subrange variable, **type checking** is performed during the compilation time and **range-checking** in performed during the execution time.